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Shuichi Mizuno

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EXAMINER

NAFF, DAVID M

ART UNIT

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1657

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

### Application No.

10/625,822

### Applicant(s)

MIZUNO ET AL.

### Examiner

David M. Naff

### Art Unit

1657

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 31-42 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 31-42 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

In view of the following new grounds of rejection, the final rejection of 9/11/07 is withdrawn, and prosecution on the merits is reopened.

5 An amendment of 10/29/07 amended claims 31, 36, 40 and 42.

The amendment has been entered.

Claims examined on the merits are 31-42, which are all claims in the application.

***Claim Rejections - 35 USC § 112***

10 The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

15 Claims 31-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

20 Claim 31 is confusing and unclear by the preamble requiring "repair of damaged, injured, diseased or aged articular cartilage and cartilage lesions", and steps d)-f) being drawn only to repair of a lesion by requiring pre-treating a lesion by depositing a bottom sealant in the lesion, implanting a construct into the lesion and  
25 depositing a top sealant over the implanted construct. It does not appear steps d)-f) can be performed when a lesion is not repaired as encompassed by the preamble. It is suggested the preamble be amended

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by canceling "damaged, injured, diseased or aged articular cartilage" to direct the preamble to repairing a cartilage lesion as required in steps d)-f).

5 In line 2 of step c) of claim 31, it would be uncertain as to how the construct differs from the support matrix since steps of preparing the construct comprising the support matrix have not been recited. It is suggested "a construct comprising" in line 2 of step c) be deleted.

10 In line 2 of step c), "of step (a)" is confusing since the seeded support matrix from step b) is used in step c). It is suggested "of step (a)" be replaced with --- from step (b) ---.

In line 3 of step c), "suspension of step (b)" is confusing since step (b) is not directed to producing a suspension. It is suggested line 3 be amended by changing "chondrocyte" to --- chondrocytes ---, and cancel "suspension of step (b)".

15 In lines 18-19 of claim 31, requiring hydrostatic pressure to be applied at about 0.01 to about 2.0 Hz is confusing since a constant hydrostatic pressure required as an alternative in line 10 cannot have a frequency expressed as Hz. Deleting "frequency of" in line 19 does not result in Hz not being a frequency since Hz is inherently a  
20 frequency. It is suggested "and is applied at from about 0.01 to about 2.0 Hz" (bridging lines 18 and 19) be deleted. If desired, the frequency can be claimed in a dependent claim further limiting the cyclic hydrostatic pressure as in claims 37 and 38.

25 Claim 36 is confusing by not having clear antecedent basis for "the Type I or Type II collagen sponge, honeycomb, scaffold or a

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honeycomb-like lattice" since a previous claim does not require a Type I or Type II collagen sponge, a honeycomb, a scaffold or a honeycomb-like lattice. Claim 31 requires a porous sponge, porous scaffold, porous honeycomb or porous honeycomb-like lattice. Additionally, the honeycomb, scaffold and honeycomb-like lattice in claim 36 are already required in claim 31. It is suggested claim 36 be amended by canceling lines 2-3, and in place thereof insert --- porous sponge, porous scaffold, porous honeycomb or porous honeycomb-like lattice is prepared from a material selected from the group consisting of Type I collagen and Type II collagen ---.

In line 2 of claim 39, "construct" is confusing for reasons set forth above in regard to "construct" recited in line 2 of step c) of claim 31. It is suggested "construct comprising said" be deleted.

The recital of "construct" in line 2 of claim 41 is confusing for reasons set forth above in regard to "construct" in claims 31 and 39. Claim 41 is further confusing by not having clear antecedent basis for "said derivatized polyethylene glycol cross-linked with methylated collagen top sealant". Derivatized polyethylene glycol cross-linked with methylated collagen has not been previously required as a top sealant. In line 6, claim 41 is unclear as to how "(superficial cartilage layer)" limits the method since this layer appears to be the same as the layer required in line 5. Bridging lines 6 and 7, claim 41 is confusing by not having clear antecedent basis for "the layer of the second sealant". A layer of second sealant has not been previously required. It is suggested claim 41 be amended as follows:

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line 1, cancel "a", line 2, cancel "combination of said construct deposited into said lesion and", line 3, before "derivatized" insert -- top sealant is ---, line 4, cancel "top sealant deposited over said construct" and insert --- and ---, line 6, cancel "(superficial cartilage layer)", and cancel "layer of" and insert --- top sealant -- -, and line 7, cancel "the second sealant".

### *Double Patenting*

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 31-38, 41 and 42 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-11 of U.S. Patent No. 7,217,294 in view of Smith et al (6,528,052).

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The patent claims require a method as presently claimed except that the matrix implanted in a cartilage lesion is not seeded with chondrocytes and subjected to a constant or cyclic hydrostatic pressure followed by a resting period before implanting as claimed.

5        Smith et al disclose a method for *in vivo*, *ex vivo* or *in vitro* repair and regeneration of cartilage. The cartilage can be articular cartilage (col 1, line 42): *In vitro* treatment is performed by obtaining cartilage cells from cartilage, applying an interval loading regiment while culturing the cartilage cells in suspension within a  
10    scaffold/support, and implanting the resultant tissue or cells into a patient (col 9, lines 23-30, and col 11, lines 5-9). The interval loading regiment involves treatment of cartilage or cartilage cells by using conditions of intermittent application of periods of hydrostatic pressure followed by periods of recovery (col 4, lines 25-31, and col  
15    7, line 30 to col 8, line 8). The recovery period can be at atmospheric or low constant pressure (col 7, lines 48-50).

It would have been obvious to seed the matrix of the patent claims with chondrocytes, and subject the seeded matrix to hydrostatic pressure and a recovery period as suggested by Smith et al to provide  
20    cells or tissue in the matrix for implanting. Specific condition of dependent claims would have been matters of obvious choice in view of conditions of the patent claims and disclosed by Smith et al.

Claim 39 is rejected on the ground of nonstatutory obviousness-type double patenting as set forth above in regard to claims 31-38, 41  
25    and 42, and further in view of Nevo et al (6,632,651).

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Claim 39 requires the matrix seeded with chondrocytes to be perfused with a medium at a flow rate from about 1  $\mu\text{L}/\text{min}$  to about 500  $\mu\text{L}/\text{min}$ .

Nevo et al disclose perfusing cells with a medium to maintain viability and growth prior to implanting (col 2, lines 8-15 and col 8, lines 41-43).

When seeding the matrix of the patent claims with chondrocytes and subjecting the seeded matrix to hydrostatic pressure as set forth above, it would have been obvious to perfuse the seeded matrix with a culture medium to maintain viability and growth of the cells as suggested by Nevo et al. Selecting a preferred flow rate of about 1  $\mu\text{L}/\text{min}$  to about 500  $\mu\text{L}/\text{min}$  would have been obvious to maintain preferred optimum viability and growth of cells.

Claim 40 is rejected on the ground of nonstatutory obviousness-type double patenting as set forth above in regard to claims 31-38, 41 and 42, and further in view of Hungerford et al (6,378,527).

The claim requires perfusion at a flow rate in a range of about 5  $\mu\text{L}$  to about 50  $\mu\text{L}$  and in the presence of about 1% to about 20% oxygen.

Hungerford et al disclose that using a low oxygen level of about 5% when culturing chondrocytes seeded on a scaffold results in enhanced expression of collagen type II and aggrecan, as well as helping maintain chondrocyte phenotype (col 24, lines 14-23).

When seeding the matrix of the patent claims with chondrocytes and subjecting the seeded matrix to hydrostatic pressure as set forth above, it would have been obvious to use an oxygen level of about 5%



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when culturing chondrocytes in the matrix to obtain enhanced expression of collagen type II and aggrecan, as well as help maintain chondrocyte phenotype as suggested by Hungerford et al. The perfusion flow rate would have been obvious for reasons set forth above.

5

**Conclusion**

The claims are free of the prior art.

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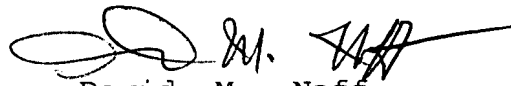
Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is 571-272-0920. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jon Weber can be reached on 571-272-0925. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
David M. Naff  
Primary Examiner  
Art Unit 1657

DMN

15 11/28/07